

MOTOR DRIVER FOR VTR

The KA8301 is a monolithic integrated circuit designed to perform bi-directional DC motor driving, braking and speed control for VCRs. The speed control can be achieved by adjusting the external voltage of the motor speed control pin.

FEATURES

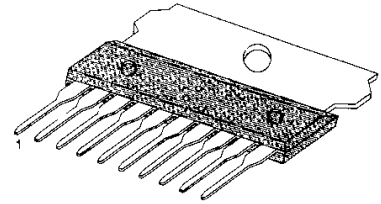
- Stable braking characteristics by built-in braking function.
- Built-in element to absorb dash current derived from changing motor direction and braking motor driving.
- Built-in external motor speed control pin.
- Stable driving direction change.
- CMOS logic level compatible input level.

APPLICATION

- VCR
- CDP
- TOY

BLOCK DIAGRAM

10 SIP H/S



ORDERING INFORMATION

Device	Package	Operating Temperature
KA8301	10 SIP H/S	- 25 ~ + 75°C

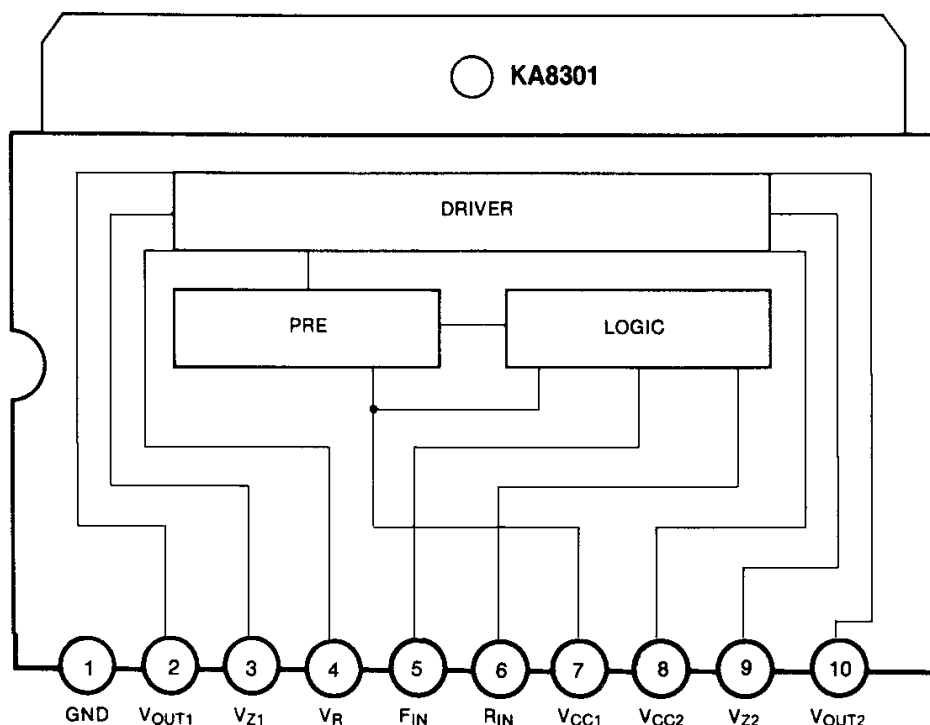


Fig. 1

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristics	Symbol	Value	Unit
Supply Voltage	V_{CC}	18	V
Allowable Power Dissipation	P_D	2.2	W
Operating Temperature	T_{OPR}	-25 ~ +75	°C
Storage Temperature	T_{STG}	-55 ~ +125	°C
Output Current	I_{OUT}	1.6*	A
Input Voltage	V_{IN}	-0.3 ~ V_{CC}	V

* Duty 1/100, pulse width 500 μ s

RECOMMENDED OPERATING CONDITIONS (Ta = 25°C)

Characteristics	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	8	12	16	V

ELECTRICAL CHARACTERISTICS ($V_{CC} = 12V$, $T_a = 25^\circ C$)

Characteristics	Symbol	Min	Typ	Max	Unit	Condition
Quiescent Current	I_{CCQ}	3	5.5	10	mA	Pin 5, 6: GND, $R_L = \infty$
Minimum Input on Current 1	I_{IN1}	—	10	50	μA	$R_L = \infty$, Pin 5: I_{IN1} , Pin 6: L
Minimum Input on Current 2	I_{IN2}	—	10	50	μA	$R_L = \infty$, Pin 5: L, Pin 6: I_{IN2}
Input Threshold Voltage 1	V_{INTH1}	0.7	1.3	2.0	V	$R_L = \infty$, Pin 5: V_{INTH1} , Pin 6: L
Input Threshold Voltage 2	V_{INTH2}	0.7	1.3	2.0	V	$R_L = \infty$, Pin 5: L, Pin 6: V_{INTH2}
Output Leakage Current 1	I_{OL1}	—	—	1	mA	$R_L = \infty$, Pin 5, 6: GND
Output Leakage Current 2	I_{OL2}	—	—	1	mA	$R_L = \infty$, Pin 5, 6: GND
Zener Current 1	I_{Z1}	—	0.85	1.5	mA	Pin 5: H, Pin 6: L, $R_L = \infty$
Zener Current 2	I_{Z2}	—	0.85	1.5	mA	Pin 5: L, Pin 6: H, $R_L = \infty$
Output Voltage 1	V_{O1}	6.6	7.2		V	Pin 5: H, Pin 6: L, $R_L = 60\Omega$
Output Voltage 2	V_{O2}	6.6	7.1		V	Pin 5: L, Pin 6: H, $R_L = 60\Omega$
Saturation Voltage Pin 10-1	V_{CE10-1}	—	0.83	1.5	V	$I_{SINK} = 100mA$ Pin 5: H, Pin 6: L, $R_L, R_C = \infty$
Saturation Voltage Pin 2-1	V_{CE2-1}	—	0.83	1.5	V	$I_{SINK} = 100mA$ Pin 5: L, Pin 6: H, $R_L, R_C = \infty$
Saturation Voltage Pin 8-2	V_{CE8-2}	—	0.83	1.5	V	$I_{SOURCE} = 100mA$ Pin 5: H, Pin 6: L, $R_L, R_C = \infty$
Saturation Voltage Pin 8-10	V_{CE8-10}	—	0.83	1.5	V	$I_{SOURCE} = 100mA$ Pin 5: L, Pin 6: H, $R_L, R_C = \infty$

TEST CIRCUIT

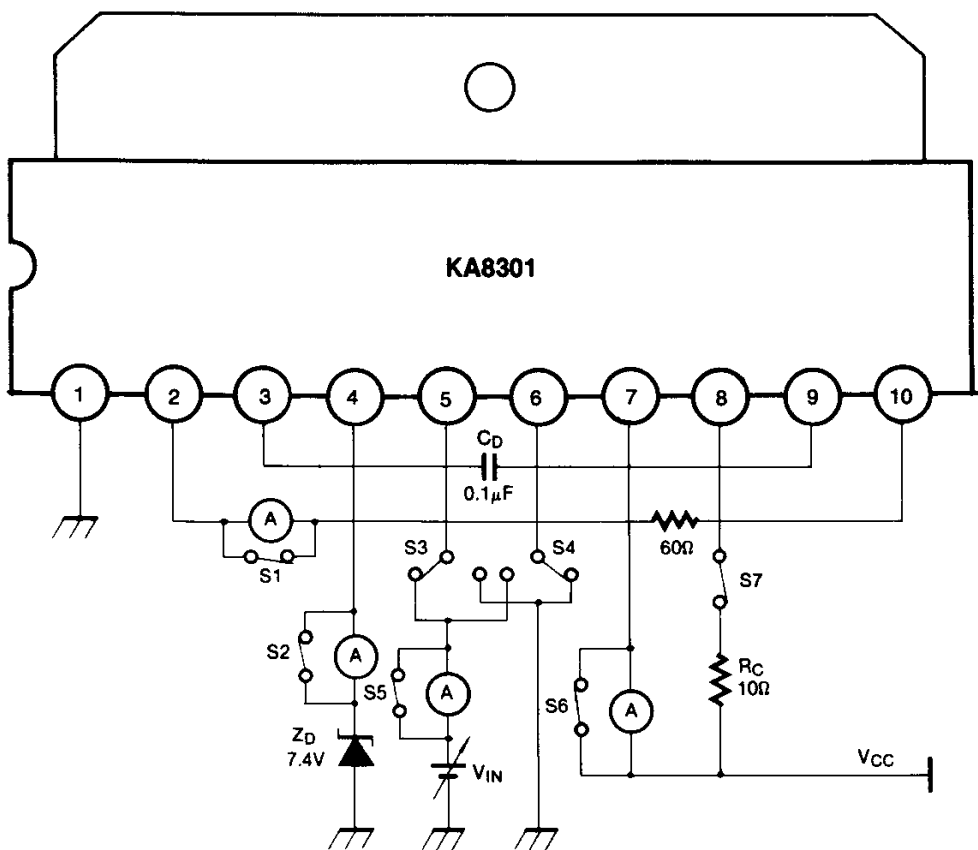


Fig. 2

LOGIC TRUTH TABLE

F_{IN} (Pin 5)	R_{IN} (Pin 6)	V_{O1} (Pin 2)	V_{O2} (Pin 10)	Note
L	L	L	L	Braking
L	H	L	H	Reverse
H	L	H	L	Forward
H	H	L	L	Braking

* Input Level 'H' > 2.0V
Input Level 'L' < 0.7V

APPLICATION INFORMATION

– FORWARD & REVERSE CONTROL LOGIC

If F_{IN} (5 pin) & R_{IN} (6 pin) = 'L', load current (I_L) flows from V_{OUT1} (2 pin) to V_{OUT2} (10 pin).

If F_{IN} = 'L' & R_{IN} = 'H', load current (I_L) flows from V_{OUT2} to V_{OUT1} .

– FORCED STOP LOGIC

If F_{IN} & R_{IN} = 'H' or 'L'. The device stops supplying power to motor while absorbing counter electromotive force from the motor as a brake.

– RUSH CURRENT ABSORBING CIRCUIT

If a high voltage generated during reversing operation is applied across V_{OUT1} & V_{OUT2} , an internal comparator activates the rush current absorbing circuit.

– DRIVING STAGE

In the forward mode, the driving stage supplies a load current to the motor from 2 pin to 10 pin. In the reverse mode. It supplies the current from 10 pin to 2 pin.

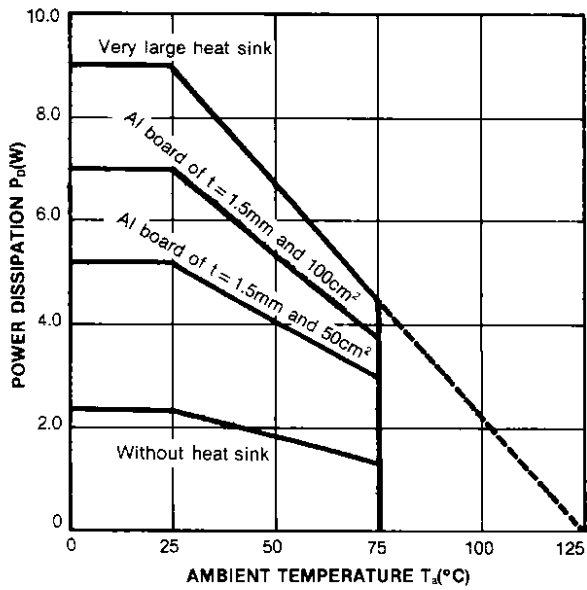
The output voltage V_{OUT} applied to the motor is given by the following method:

$V_{OUT(V)} = V_{ZD} - V_{CE(SAT)}$ V_{ZD} ; Zener Voltage applied to 4 pin.

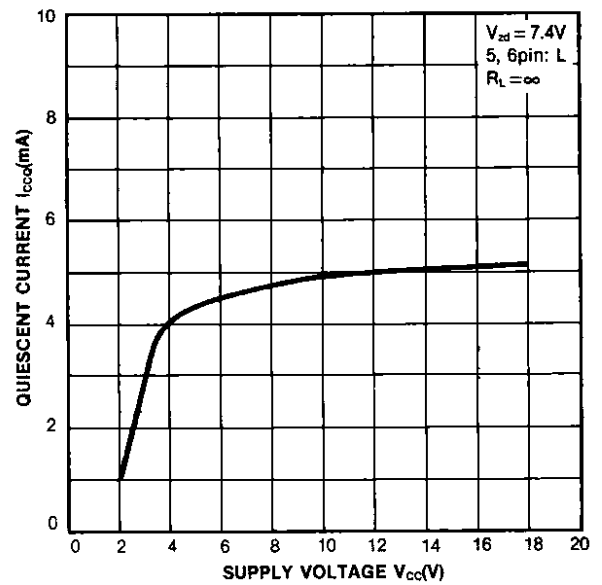
If 4 pin is left open, the output voltage is given by the following method:

$V_{OUT(V)} = V_{CCI} - V_{CE(SAT PNP)} - 2V_F - V_{CE(SAT)}$

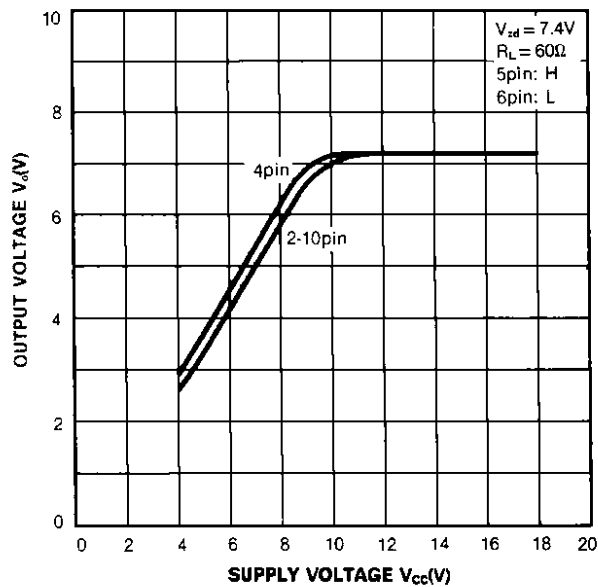
POWER REDUCTION CURVE



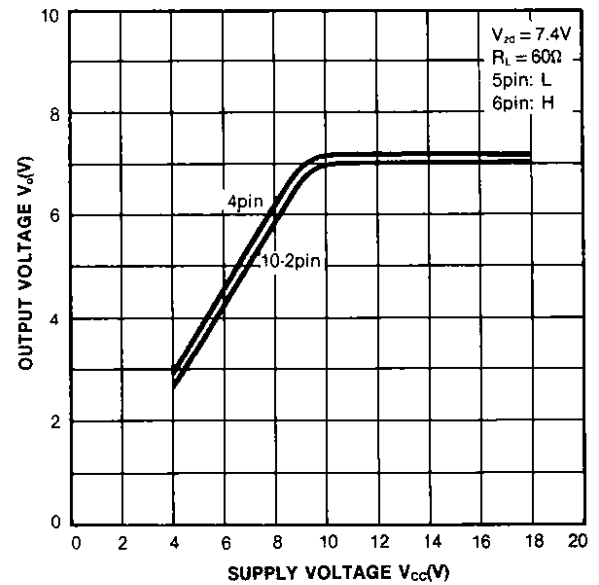
QUIESCENT CURRENT VS. SUPPLY VOLTAGE



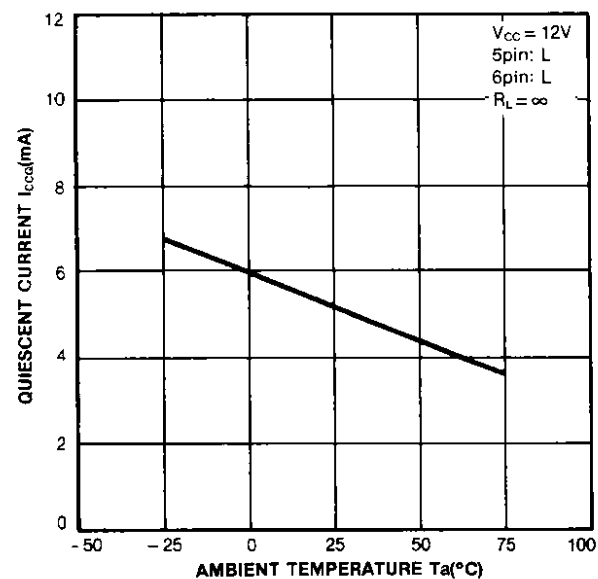
MAXIMUM OUTPUT VOLTAGE VS. SUPPLY VOLTAGE



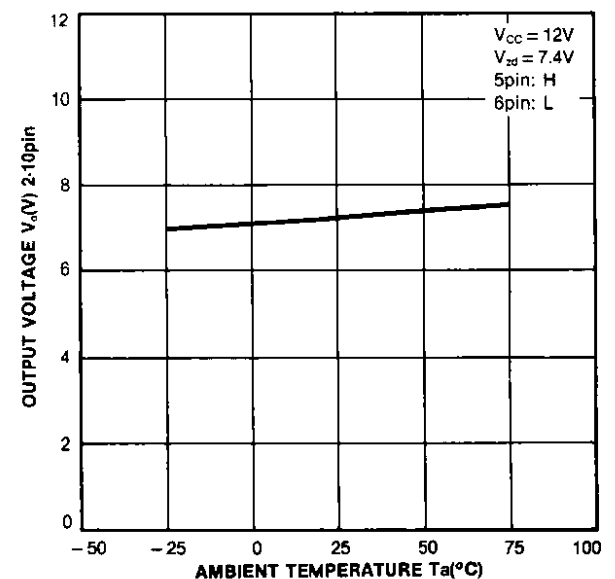
MAXIMUM OUTPUT VOLTAGE VS. SUPPLY VOLTAGE



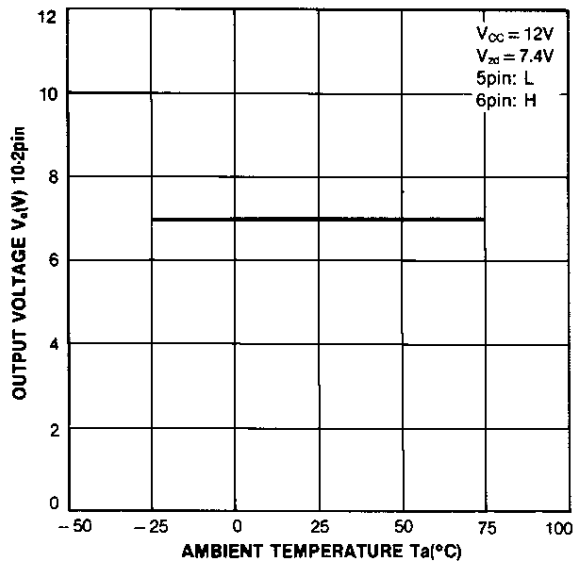
QUIESCENT CURRENT VS. AMBIENT TEMPERATURE



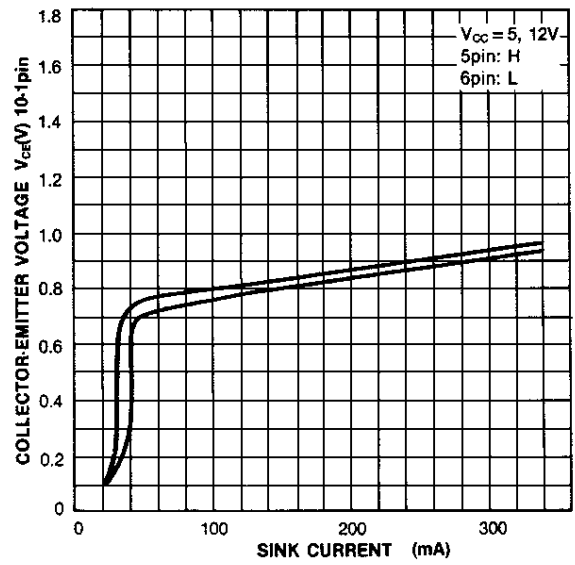
OUTPUT VOLTAGE VS. AMBIENT TEMPERATURE



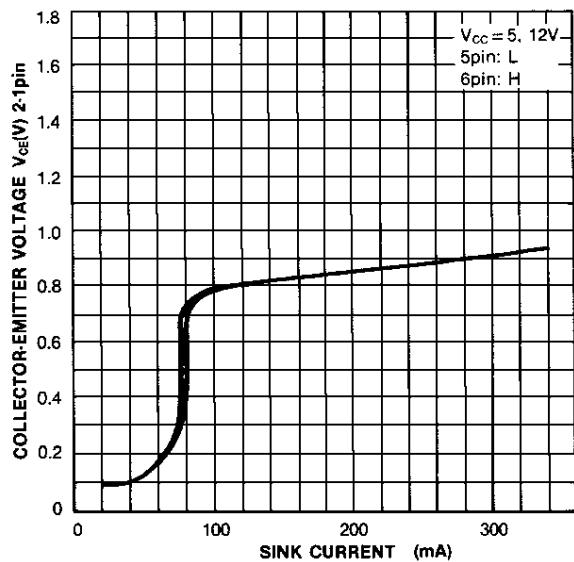
**OUTPUT VOLTAGE
VS. AMBIENT TEMPERATURE**



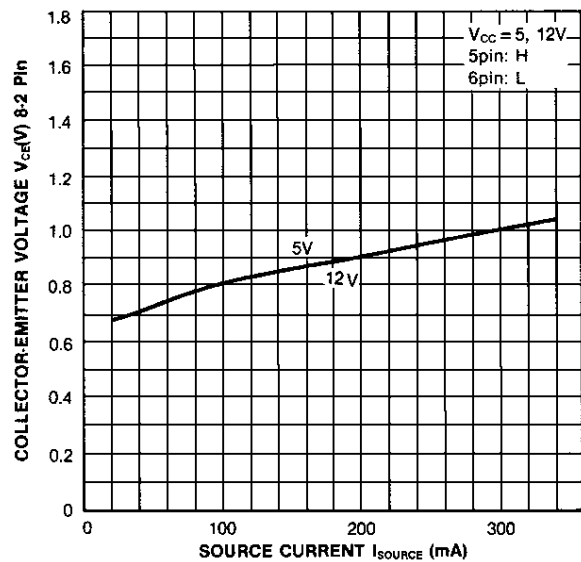
**OUTPUT SATURATION VOLTAGE
VS. SINK CURRENT**



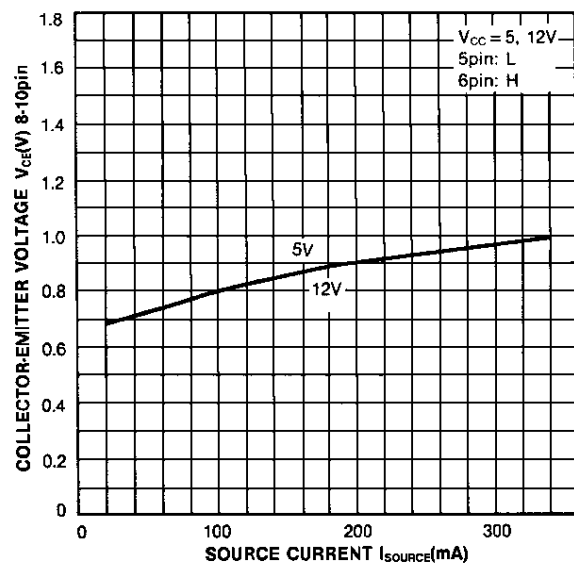
**OUTPUT SATURATION VOLTAGE
VS. SINK CURRENT**



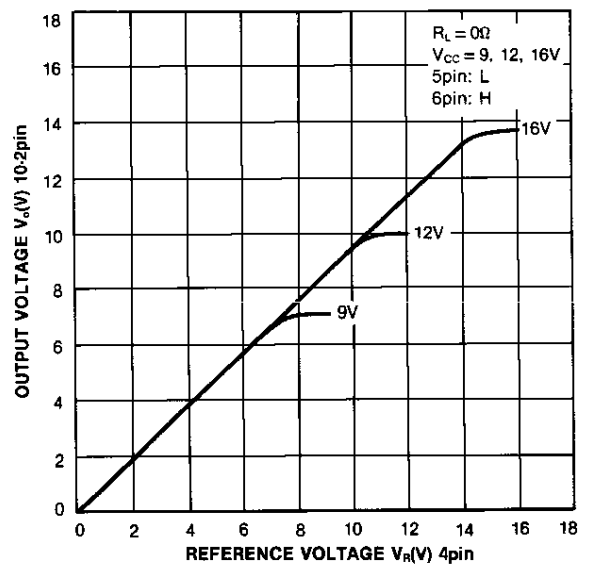
**OUTPUT SATURATION VOLTAGE
VS. SOURCE CURRENT**



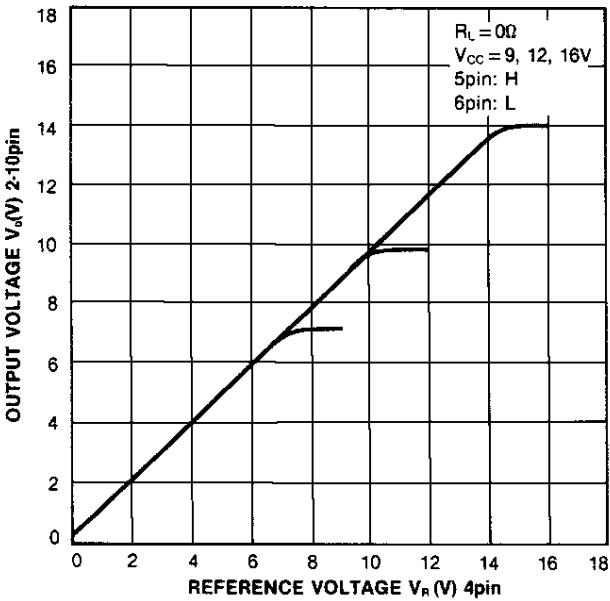
**OUTPUT SATURATION VOLTAGE
VS. SOURCE CURRENT**



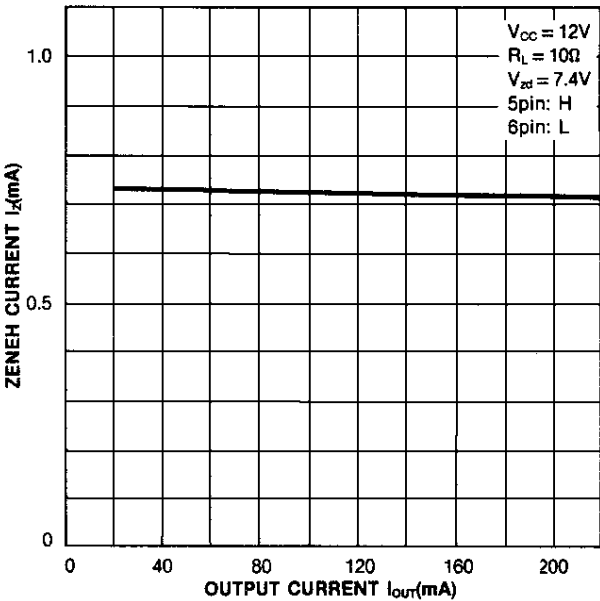
**OUTPUT VOLTAGE
VS. REFERENCE VOLTAGE**



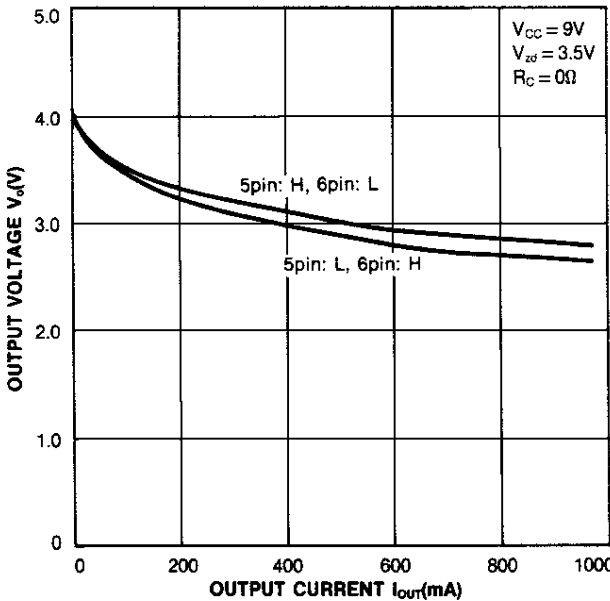
OUTPUT VOLTAGE VS. REFERENCE VOLTAGE



ZENER CURRENT VS. OUTPUT CURRENT



OUTPUT VOLTAGE VS. OUTPUT CURRENT



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